



**COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
Metropolitan Boston – Northeast Regional Office**

MITT ROMNEY  
Governor

KERRY HEALEY  
Lieutenant Governor

ELLEN ROY HERZFELDER  
Secretary

EDWARD P. KUNCE  
Acting Commissioner

May 19, 2003

Thomas W. Knowlton  
Salem & Beverly Water Supply Board  
50 Arlington Ave.  
Beverly, MA 01915

Re: Water Management Permit Review # 9P-3-17-258.01

Dear Mr. Knowlton:

The Department of Environmental Protection (the "Department" or "DEP") has completed its review of all the Water Withdrawal Permits issued in the Ipswich River Basin including the Permit issued to the Salem & Beverly Water Supply Board (the "Board") Permit 9P-3-17-258.01. The Permit issued in 1991 authorized the Board to withdraw an annual average daily volume of 1.14 million gallons per day ("MGD"). The Permit further allowed the Board to increase that annual average daily volume to 1.47 MGD in 1994, to 1.70 MGD in 1999 and to 2.27 MGD in 2004. The volumes authorized by the Permit are in addition to the 10.17 MGD that the Board was previously registered to withdraw. The Board appealed the Permit (Docket No. 91-052).

In accordance with the Water Management Act Regulations, 310 CMR 36.33(4), the Department initiated a review of the Permit in 1994. As a result of that review, the Department determined that water use by all permittees in the Ipswich River Basin was below the volumes originally allocated. Accordingly, the Permit as modified in 1997 provided that the authorized annual daily withdrawal volume shall remain at 1.14 MGD until 1999. The Board appealed the Permit as modified in 1997, and the Ipswich River Watershed Association intervened in the Board's appeal. In December 1998, the parties agreed that the Board would be governed by an Interim Modified Water Withdrawal Permit until the Permit was further modified. The parties further agreed to stay the appeal until that modification

At the time of that agreement, the parties expected that the United States Geological Survey (USGS) studies of flows in the Ipswich River would be completed and that information from those studies would be available in 1999. The parties also expected that the Permit would

This information is available in alternate format. Call April McCabe, ADA Coordinator at 1-617-556-1171.

205A Lowell St. Wilmington, MA 01887 • Phone (978) 661-7600 • Fax (978) 661-7615 • TTD# (978) 661-7679

DEP on the World Wide Web: <http://www.mass.gov/dep>



Printed on Recycled Paper

be further modified in 1999. Because the USGS studies took longer than expected, by agreement of the parties, the stay of the appeal has remained in effect.

When the USGS studies were nearing completion, on December 13, 2002, DEP issued an Order to Complete requiring that the Board submit additional information. The Board responded to the Order to Complete on March 19, 2002. DEP has reviewed the information from the USGS studies along with the Board's Response to the Order to Complete and has issued the Modified Permit (enclosed herein) that reflects a balance between the public's need for a safe and reliable source of drinking water and competing environmental, economic and recreational interests.

As a result of this review, DEP has determined that to further the purposes of the Water Management Act, it is necessary to achieve a balance throughout the year between the major hydrologic alterations in flow caused by the diversions for water supply purposes and the need to maintain the seasonal variations in flow that support the natural ecosystem. The Department has determined that maintaining high flows at certain times of the year is necessary to ensure that the river functions both as a viable habitat for aquatic life and wildlife and as a reliable source of safe drinking water. High flows scour the river bottom, maintain the floodplain ecosystem, trigger spawning runs, provide spawning habitat in the floodplains, maintain wetland hydrology, and recharge aquifers. In the absence of adequate diversion thresholds, it is possible that the total volume of water diverted from the Ipswich River by public water suppliers may approach or even exceed the flow remaining in the river, if droughts occur in late fall, winter or spring. Loss of water during late fall, winter and spring may adversely affect the availability of habitat, susceptibility to freezing, geomorphological processes and other ecological values.

To address these concerns, the Ipswich River Fisheries Restoration Task Group ( the "Fisheries Group") recommended the streamflows that are needed to sustain throughout the year a viable habitat for aquatic life accommodated to riverine conditions. These Fisheries Group Recommendations are as follows: November thru February 1.0 cfs; March thru May 2.5 cfs; June thru October 0.49 cfs.<sup>1</sup>

To begin the process of mitigating these adverse impacts, the Department has established interim streamflow diversion thresholds. These interim streamflow diversion thresholds incorporate the recommendations of the Fisheries Group for November thru February. To balance the need for drinking water with competing environmental concerns, the Department established an interim streamflow diversion threshold of 1.0 cfs for the months March thru May, in lieu of the threshold recommended by the Fisheries Group. Although the interim streamflow diversion threshold is not as protective as the threshold recommended by the Fisheries Group, the Department's initial review indicates that the three public water suppliers that divert from the Ipswich River can meet the needs of their consumers under this threshold.

---

<sup>1</sup> Relying on the minimum streamflow findings in the USGS Ipswich Habitat Study (WRIR 01-4161) and other USGS studies in the Ipswich River Basin, the Department also adopted a 0.42 cfs threshold for the low flow period, June thru October. Additional discussion of this threshold is included in the discussion of streamflow triggers for restrictions on nonessential outside water use.

The Department also established an interim streamflow diversion threshold, based on the 90<sup>th</sup> percentile magnitude for June's monthly mean discharge simulated for no-withdrawals, which is approximately 3 cfsm for June thru October. While still protective of ecological function, this additional interim streamflow diversion threshold allows the public water suppliers that divert from the Ipswich River to take advantage of high flows, that occasionally occur in the summer, after significant storm events such as hurricanes.

Because the Fisheries Group recommendations are based on the best available science, it is very possible that the Department may in the future adopt their streamflow recommendations for the months March thru May as it continues to balance drinking water needs with competing environmental concerns. For that reason, the Modified Permit expressly provides that the interim streamflow diversion thresholds shall remain in effect, only until the Department gathers sufficient information to establish additional interim streamflow diversion thresholds or final streamflow diversion thresholds. This additional information includes without limitation the ongoing supplemental modeling by the USGS to evaluate alternative management scenarios for a firm yield determination.

While these interim streamflow diversion thresholds are in effect, the Modified Permit requires that each public water supplier that diverts water from the Ipswich River identify additional actions that are needed to meet demand after final streamflow thresholds are adopted. Thus, the Modified Permit expressly requires that the Board continue to determine whether there are additional actions that can be taken to optimize the use of existing sources including without limitation operational changes, the installation of variable speed pumps, development of a reservoir, increasing the hydraulic capacity from Longham Reservoir into Wenham Lake Reservoir, and increasing the storage capacity of the existing reservoirs.

In addition to the interim streamflow diversion thresholds, the Department has determined that a total authorized volume of 11.31 MGD is sufficient to meet the demand of the cities of Salem and Beverly. In these circumstances the Department has decided to limit the Board's permitted volume to the 1.14 MGD originally authorized in 1991.

DEP has further determined that unless and until conditions in the Ipswich River significantly improve, it is unlikely that any permittees in the Ipswich River Basin will be approved to increase their authorized withdrawals. In these circumstances it is essential that all permittees keep their withdrawals at or below their authorized volumes.

Consistent with this purpose, the Modified Permit provides that if the Board exceeds its total authorized volume of 11.31MGD, the cities of Salem and Beverly shall each implement a water bank that provides for conserving at least two gallons of water for every additional gallon of water demand. To avoid the water bank requirement, the cities of Salem and Beverly should work to keep demand for water in their communities within the total authorized volume.

To reduce the adverse impacts on the ability of the Ipswich River to sustain all its uses, DEP has established the following performance standards for permittees that withdraw water from the Ipswich River Basin for water supply purposes:

1. Residential per capita water use of 65 gallons per day or less;
2. Unaccounted for water of 10% or less; and
3. A summer withdrawal cap based on minimizing the difference between summer (May thru September) and winter (January thru March and November thru December) withdrawals derived from each community's summer to winter withdrawal ratio.

The standards set forth above shall hereinafter be referred to collectively as the "Ipswich River Basin Performance Standards". The Modified Permit expresses the Department's expectation that the cities of Salem and Beverly shall comply with the Ipswich River Basin Performance Standards and other applicable conditions of the Modified Permit, including without limitation requirements pertaining to the implementation of restrictions on nonessential outside water use, water conservation, reporting, implementation of a water bank, reduction in commercial and industrial water use, retrofit of public buildings, leak detection and repair, in the same manner and to the same extent as the public water suppliers that hold permits to withdraw water in the Ipswich Basin.

The standards of 65 gallons per day or less for residential per capita water use and 10% or less for unaccounted for water are taken from the Water Resources Commission performance standards for effective water conservation for public water suppliers. While these performance standards represent the minimum standards required for compliance with the Modified Permit, the Department believes that through the implementation of all the terms and conditions of the Modified Permit, Salem and Beverly can exceed the performance standards for residential per capita water use and unaccounted for water. DEP will review the Drinking Water Program's Annual Statistical Report when evaluating compliance with these performance standards. The reporting requirements added in the Modified Permit are intended to standardize the information submitted to the Department to assess compliance with the Modified Permit and the Ipswich River Basin Performance Standards.

The Department has established a summer withdrawal cap for Salem and Beverly that targets conservation when demands are especially high. More specifically, the summer withdrawal cap is intended to reduce the difference between summer and winter water use. Based on the four- year period 1999 thru 2002, communities with an average summer to winter withdrawal ratio of 1.4 or greater are required to reduce the summer to winter difference in withdrawal volumes by 50% beginning in calendar year 2004. Communities with an average summer to winter withdrawal ratio that is less than 1.4 are required to reduce the summer to winter difference by 25% beginning in calendar year 2004. The median of the four year summer to winter withdrawal ratio is 1.4. Reductions in the summer to winter difference are based on the year, within the four -year period from 1999 thru 2002, when seasonal water use was highest.

In the four-year period 1999 thru 2002, Salem had an average summer to winter withdrawal ratio of 1.13. Salem experienced its highest summer water use in 2001. Salem shall achieve a 25% reduction in the difference between its 2001 summer and winter water use. To achieve this reduction, Salem shall keep its water use at or below an average daily volume of 6.03 MGD from May 1<sup>st</sup> thru September 30<sup>th</sup>. Salem's overall system-wide use from May 1<sup>st</sup>

thru September 30<sup>th</sup> shall not exceed 922.59 million gallons. In 2000, Salem limited its summer water use to an average daily volume of 5.59 MGD for the five-month summer period.

In the four-year period 1999 thru 2002, Beverly had an average summer to winter ratio of 1.27. Beverly experienced its highest summer water use in 1999. Beverly shall achieve a 25% reduction in the difference between its 1999 summer and winter water use. To achieve this reduction, Beverly shall keep its water use at or below an average daily volume of 5.38 MGD from May 1<sup>st</sup> thru September 30<sup>th</sup>. Beverly's overall system-wide use from May 1<sup>st</sup> thru September 30<sup>th</sup> shall not exceed 823.14 million gallons from May 1<sup>st</sup> thru September 30<sup>th</sup>. Beverly has been able to limit its summer use to an average daily volume of 4.88 million gallons for the five-month summer period.

To improve streamflows so that the Ipswich River can once again function as a viable habitat for aquatic life adapted to riverine conditions and to ensure that the Ipswich River remains a reliable source of safe drinking water, DEP has required the following restrictions on nonessential outside water use:

1. All permittees withdrawing water from the Ipswich River Basin for public water supply purposes shall institute voluntary restrictions on nonessential outside water use, whenever streamflow in the Ipswich River falls below 0.56 cfs for three consecutive days in the period from May 1<sup>st</sup> thru September 30<sup>th</sup>. The streamflow threshold of 0.56 cfs is based on wetted perimeter flow for a natural site in the Ipswich River as determined by the USGS habitat assessment study. A fully wetted channel bed in riffles is an index of the carrying capacity of a stream that is proportional to fish-food producing areas.
2. All permittees withdrawing water from the Ipswich River Basin for public water supply purposes shall implement and enforce mandatory restrictions on nonessential outside water use whenever streamflow falls below 0.42 cfs for three consecutive days in the period from May 1<sup>st</sup> thru September 30<sup>th</sup>. Based on evaluation of streamflow requirements, USGS determined that 0.42 cfs is a reasonable target for streamflow for habitat protection necessary to support aquatic life adapted to riverine conditions. At a minimum, mandatory restrictions on nonessential outside water use shall include restrictions requiring hand-held hoses only and limiting the hours for outside watering to exclude 9 a.m. to 5 p.m. when evapotranspiration is typically the highest. Notwithstanding the foregoing, irrigation of public parks and recreational fields by means of automatic sprinklers equipped with moisture sensors or similar control technology may also be permitted outside of the hours 9 a.m. to 5 p.m. Enforcement of mandatory restrictions shall include the assessment of penalties or the imposition of fines for violations.

A notice of the voluntary and mandatory restrictions shall be published in the local newspaper. When streamflow is greater than the thresholds set forth above for a period of seven consecutive days, the corresponding level of restrictions may be lifted.

The restrictions set forth above apply to nonessential outside water use. The term “nonessential outside water use” includes uses that do not have health or safety impacts, are not required by regulation, and are not needed to meet the core functions of a business or other organization. Examples of nonessential outside water uses include irrigation of lawns and ornamental plants; washing of vehicles unless necessary for operator safety (subject to the exceptions set forth below); washing of building exteriors, outside structures, streets, sidewalks and parking lots (with the exceptions set forth below); the filling of swimming pools and hot tubs; and the operation of decorative pools and fountains. Examples of essential outside water uses may include water use for the production of food and fiber and the maintenance of livestock and poultry; outside water use by plant nurseries to maintain their stock; the watering of golf course greens; the washing of vehicles by commercial car washes, maintenance facilities and dealers, and the washing of exterior building surfaces including windows, parking lots, driveways, or sidewalks, prior to application of paint, preservatives or stucco or for the preparation of the surface prior to paving or repointing of bricks, or if required by health and safety regulations.

To enable Salem and Beverly to comply with the Ipswich River Basin Performance Standards for residential per capita water use and seasonal water use, the Modified Permit requires the development and implementation of an enhanced water conservation plan in the event that in any year beginning with calendar year 2004, Salem and/or Beverly is not in compliance with these Performance Standards. In light of this provision, DEP intends to review at least annually the progress that Salem, Beverly and the Board have made in complying with the Ipswich River Basin Performance Standards and the Modified Permit. Moreover, DEP will take whatever action it deems appropriate to bring permittees into compliance with the modified permits and the Ipswich River Basin Performance Standards, including without limitation requiring more stringent restrictions on nonessential outside water use, further modifying the permits in the Ipswich River Basin and/or initiating enforcement actions with and without the assessment of civil administrative penalties.

The Department understands that Salem, Beverly, and Wenham are not listed in the Modified Permit as the permittee. Nevertheless, the Department expects the cities of Salem and Beverly to cooperate in the implementation of all the terms and conditions of the Modified Permit including the conservation requirements. In addition, the Department expects Beverly and Wenham to cooperate in the adoption of source protection controls. It is essential that all municipal departments, boards, officials, and employees work together in support of this effort.

The Water Management Act, G.L.c. 21G, sec. 14, expressly authorizes the Department to issue such orders as are reasonably necessary to aid in the enforcement of the provisions of the Act including requiring compliance with such terms and conditions as are reasonably necessary to effect the purposes of the Act. If the Department determines that Salem, Beverly, and/or Wenham are not fully implementing the actions called for in the Modified Permit, the Department will take whatever action it determines is appropriate to require Salem, Beverly and/or Wenham to implement these actions including without the limitation the issuance of unilateral enforcement orders under the Water Management Act, G.L.c. 21G, sec. 14.

That being said, DEP remains committed to working with the Board, Salem, Beverly, Wenham and all the permittees in the Ipswich River Basin so that the Ipswich River may once again sustain all its uses as a habitat for aquatic life and wildlife that are adapted to riverine conditions, a place for primary and secondary contact recreation and a reliable source of safe drinking water. Further, the Department wishes to commend the Board and the cities of Salem and Beverly for the efforts they have made in recent years to promote water conservation and reduce unaccounted for water. In particular, the Department wishes to applaud Salem and Beverly for its meter replacement program and Beverly for its recent success in leak detection.

The Department has determined that the Board's actions in maintaining the canal may adversely impact the adjacent wetlands. This area serves as a habitat for the mussel species known as the Triangle floater, a species of special concern. The plants along the canal also serve as a nectaring and egg-laying source for a variety of butterfly species. To ensure that the Board's actions in maintaining the canal do not adversely impact the habitat functions of the adjacent wetlands, the Department has required the development and implementation of a plan for maintaining the area surrounding the canal by removing vegetation, mowing, dredging, cutting trees or otherwise altering wetlands.

The 1991 appeal of the Board's Water Management Act Permit 9P-3-17-258.01 and of the Permit as modified in 1997 have been consolidated into a single matter. The consolidated matter, Docket No. 97-062, has been stayed, and the Board has been acting by agreement of the parties in accordance with an Interim Modified Water Withdrawal Permit pending this Permit Modification. If this Modified Permit is also appealed, it is likely that this appeal will be consolidated with the outstanding appeals.

The Board has the right to appeal the Modified Permit in accordance with 310 CMR 36.40. Any such appeal must be received by the Department within twenty-one days of receipt of the Modified Permit.

If you have any questions regarding this Modified Permit, please contact Kellie O'Keefe at 978-661-7765. Please note that the Northeast Regional Office of DEP will be moving in mid to late June to One Winter Street in Boston. Please check the DEP website [www.state.ma.us/dep/nero](http://www.state.ma.us/dep/nero) for further information on how to reach regional staff after the move.

Very truly yours,

Madelyn Morris  
Deputy Regional Director  
Bureau of Resource Protection

CC: Mayor Thomas M. Crean, City Hall, 191 Cabot St. Beverly, MA 01915  
Frank Killilea, Beverly Water Dept. 148 Park St., Beverly MA 02478  
Mayor Stanley Usovich, Jr., City Hall, 93 Washington St., Salem, MA 01970  
Bruce Thibodeau, Salem Water Dept., One Salem Green, Salem, MA 01970

Ginger Hartman, Camp Dresser & McKee, 50 Hampshire St., Cambridge, MA 02139

Duane Levangie WMA Program, Boston

Peter Hersee, Board of Selectmen, Town of Wenham, 138 Main St., Wenham, MA 01984